Joint Fire Science Program
FIREHouse
The Northwest and Alaska Fire Research Clearinghouse
www.fs.fed.us/pnw/fera/firehouse
Fire and Environmental Research Applications Team
Pacific Wildland Fire Sciences Laboratory

Fire and Climatic Variability in the Inland Pacific Northwest: Understanding Past Fire Regimes Will Help Present-day Management

Overview

This project analyzes relationships between climate and topography and spatio-temporal patterns in historical fire regimes in the inland Pacific Northwest, using fire-history data from the Wenatchee, Okanogan, and Colville National Forests. The primary constraints on fire occurrence and fire extent change across spatial scales. At small scales (within watersheds), topography controls fire sizes, and rates of fuel accumulation control fire frequency. Viewed across the entire study area, climatic variation and extreme climatic conditions such as drought control the area burned and the synchrony between fires. These constraints have clearly weakened, however, since the beginning of active fire suppression. By understanding how the dominant processes that drive fire regimes have changed across scales and under different management, we can enhance our knowledge of fire as a keystone process in ecosystem dynamics and improve our ability to anticipate severe fire seasons, allowing for efficient allocation of resources.

Climatic Variability and Fire Occurrence

Broad-scale relationships between fire and climate are poorly understood in the Pacific Northwest. We are using extensive fire history data to answer the following questions:

- What is the relationship between patterns of fire occurrence and climatic variability?
- How do relationships between climate and fire vary in space (between watersheds), and over time (prior to and following Euro-American land use changes)?

Our results show that summer drought during the year of the fire is the primary climatic factor associated with major fire years. Fire frequency decreased dramatically in the 20th century, reflecting a period of land use and land cover change associated with reduction of Native American ignition sources, major Euro-American settlement, introduction of domestic livestock, logging, and active fire suppression. As human influences became more important, summer drought was less important in affecting fire occurrence. Climate records indicate that severe drought occurred seven times during the 20th century, but fires remained isolated and relatively small.

Spatial Patterns and Topographic Constraints on Fire Within Watersheds

An understanding of baseline fire variability is necessary in order to identify spatial controls on fire regimes. Spatial models are being applied to five watersheds to identify topographic and environmental controls on fire extent. Spatial and temporal patterns in fire regimes are closely associated with topography, more than with variability in environmental factors such as solar radiation and soil moisture. Temporal controls, particularly rate of surface fuel accumulation, lead to changing fire hazard with time since previous fire. Our results demonstrate spatially explicit controls on low-severity fire regimes; understanding these can lead to detailed prescriptions for fuel management.

GIS Fire History Web Server

We are constructing an Internet map server to disseminate data from our study area, including year-by-year maps of fire history and spatial patterns of fire occurrence. The site will provide access to the GIS layers, tabular datasets, summary statistics, metadata, and a graphical representation of the database. We are building a GIS web server to accept fire-history queries and link to the Paleofire fire-history data bank.

For More Information about Fire and Climatic Variability in the Inland Pacific Northwest

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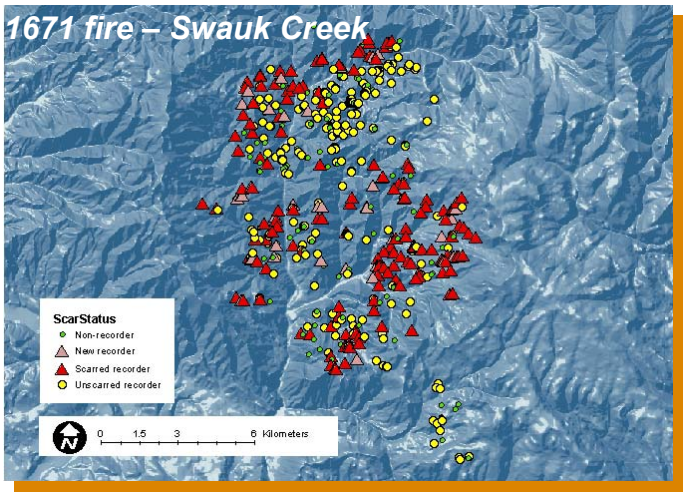

About FIREHouse

FIREHouse is a collaboration between the Fire and Environmental Research Applications Team (FERA) of the USDA Forest Service Pacific Northwest Research Station, Pacific Wildland Fire Sciences Laboratory; the University of Washington; the National Park Service; the Bureau of Land Management – Alaska Fire Service; the US Fish and Wildlife Service; and the National Biological Information Infrastructure (NBII). Funding for FIREHouse has been provided by the Joint Fire Science Program (JFSP) and NBII. FIREHouse is coordinating efforts with the Fire Research and Management Exchange System (FRAMES) project team. Content on FIREHouse will provide substantial contributions to the FRAMES Northwest and Alaska Geo Portals.

For More Information about the FIREHouse Project

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